Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A method for estimating remaining film thickness distribution of a surface protection film that remains on each activation region after chemical mechanical polishing when a semiconductor substrate having the surface protection film is etched using a patterning mask that has a mask pattern for producing an activation region to form a device isolation trench so as to create the activation region, an insulating film is provided over the activation region to fill the device isolation trench, and chemical mechanical polishing is performed on the semiconductor substrate with the insulating film provided thereon to form a device separating portion,

the patterning mask comprising a plurality of one-chip mask regions arranged in matrix, and each of the one-chip mask regions comprising [[the]] a same number of the mask patterns in [[the]] a same layout,

the method for estimating remaining film thickness distribution comprising:

~~a step for~~ generating a reduced region on each of the mask patterns by removing a predetermined width from the mask pattern along [[the]] an edge of the mask pattern;

~~a step for~~ segmentalizing the one-chip mask region into predetermined segmentalized regions to generate segmentalized regions and ~~for acquiring~~ to acquire

an area ratio of all reduced regions with respect to each of the segmentalized regions, [[the]] all of the reduced regions occupying a region that includes the segmentalized region at a fixed position and has [[the]] a same size and shape as those of the one-chip mask region; and

~~a step for~~ acquiring the ~~distribution of the~~ remaining film thickness distribution in the one-chip mask region based on ~~the basis of~~ the area ratio.

Claim 2 (Currently Amended): The method for estimating remaining film thickness distribution according to Claim 1, wherein the reduced region is generated so as to have substantially [[the]] a same size and shape as those of a top surface region of the insulating film that covers the activation region corresponding to the reduced region.

Claim 3 (Currently Amended): A method for estimating remaining film thickness distribution of a surface protection film that remains on each activation region after chemical mechanical polishing when a semiconductor substrate having the surface protection film is etched using a patterning mask that has a mask pattern for forming an activation region to form a device isolation trench so as to create the activation region, an insulating film is provided over the activation region to fill the device isolation trench, and chemical mechanical polishing is performed on the semiconductor substrate with the insulating film provided thereon to form a device separating portion,

the patterning mask comprising a plurality of one-chip mask regions arranged in

matrix, and each of the one-chip mask regions comprising [[the]] a same number of the mask patterns in [[the]] a same layout,

the method for estimating remaining film thickness distribution comprising:

~~a step for~~ generating a reduced region for each of the mask patterns by removing a predetermined width from each mask pattern along [[the]] an edge of the mask pattern;

~~a step for~~ generating a frame-shaped region by removing, from the mask pattern, a regional portion that overlaps the reduced region corresponding to the mask pattern;

~~a step for~~ segmentalizing the one-chip mask region into predetermined segmentalized regions to generate segmentalized region and ~~for acquiring~~ to acquire an area ratio ~~ratios~~ of all reduced regions and frame-shaped regions, respectively, with respect to each of the segmentalized regions ~~region~~, the reduced regions and the frame-shaped regions occupying a region that includes the segmentalized region at a fixed position and has [[the]] a same size and shape as those of the one-chip mask region in each of the segmentalized regions; and

~~a step for~~ acquiring the ~~distribution of the~~ remaining film thickness distribution in the one-chip mask region based on ~~the basis of~~ the area ratio of the reduced regions and the area ratio of the frame-shaped regions.

Claim 4 (Currently Amended): A patterning mask design method for designing a patterning mask [[by]] using the method for estimating remaining film thickness

distribution according to any one of Claims 1 to 3, comprising:

~~a step for~~ extracting a first region predicted to have a high polishing rate in the one-chip mask region; and

~~a step for~~ setting a first pseudo mask pattern for forming a first pseudo activation region outside the mask pattern in the first region.

Claim 5 (Currently Amended): The patterning mask design method according to Claim 4, further comprising:

~~a step for~~ extracting a second region predicted to have a low polishing rate in the one-chip mask region; and

~~a step for~~ designing a second pseudo mask pattern for forming a second pseudo activation region outside the mask pattern in the second region, wherein

a ratio of area of the mask pattern and the regions in which the first and second pseudo mask patterns are formed that occupies each one-chip mask region is substantially fixed.

Claim 6 (Currently Amended): The patterning mask design method according to Claim 5, wherein an elongate region is set as the second pseudo mask pattern in ~~the step for forming the~~ said designing a second pseudo mask pattern.

Claim 7 (Currently Amended): The patterning mask design method according to any

one of Claims 5 and 6, wherein [[the]] a space size of the first pseudo mask pattern is set according to [[the]] a space size of [[the]] a region outside the mask pattern of the first region.

Claim 8 (Currently Amended): The patterning mask design method according to any one of Claims 5 and 6, wherein [[the]] an area ratio of the first pseudo mask pattern occupying ~~the area~~ a region outside the mask pattern in [[a]] the first region is increased according to a predicted level of polishing rate in a plurality of [[the]] first regions in said setting ~~the step for forming~~ the first pseudo mask pattern.

Claim 9 (Currently Amended): A manufacturing method for a semiconductor device using the patterning mask according to any one of Claims 5 and 6, comprising:

~~a step for~~ etching the semiconductor substrate having the surface protection film [[by]] using the patterning mask so as to form a [[left]] remaining activation region and a device isolation trench produced by [[the]] said etching.